대학원 석사과정 종합시험 범위

◎ 대수학I
- Group – group presentation, finitely generated abelian group, Sylow theorems, nilpotent group, solvable group
- Ring and modules – Hom-functor, tensor product of modules, injective(projective) module
- Linear algebra – determinant, Jordan canonical form (via classification of finitely generated modules over a PID), orthogonal (symmetric, symplectic) matrix, Sylvester theorem, spectral theorem, tensor algebra, exterior algebra

◎ 대수학II
- Ring and modules – UFD and Polynomials, Gauss lemma, Eisenstein criterion, discriminant, resultant, Chinese remainder theorem, R-algebras, ring(module) of quotients, Noetherian ring, Hilbert basis theorem
- Fields – finite extension fields, finite fields, Galois Theory, Galios group of polynomial, cyclotomic extension.

◎ 실해석학I
- Measures (sigma-algebras, measures, outer measures, Borel measures on R),
- Integrations(measurable functions, integration of nonnegative functions, integrations of complex functions, modes of convergence, product measures)
- Lp-spaces

◎ 복소해석학I
- Complex numbers, Complex functions, Analytic functions, Conformal mappings, Linear fractional transformations, Cauchy's theorems and formula, Singularities, Calculus of residue, Harmonic functions, etc.

◎ 미분위상수학
- 'Differential Topology' (Pollack)
- '다양체의 미분위상수학' (조용승) pp.1-133.
  Diff. Manifold, Transversality, Intersection number, de Rham Cohomology.

◎ 대수적위상수학
- Fundamental Groups : definition of homotopy path, homotopy of maps, fundamental group of circles and surfaces 등
- Covering spaces : covering spaces, lifting criterion, Jordan curve theorem, classification of covering spaces 등

◎ 수치미분방정식

- Characteristics and boundary conditions for 1st, 2nd PDE
- FDM and order of truncation error, methods for IVP, Computational methods for PDE in 1D and 2D, Consistency on regular and irregular grids
- Methods of weighted residual, Finite Element Methods, Elements for PDE in 1/2/3D, mathematical properties of Galerkin FEM.

◎ 암호학

- 'Algebraic Aspects of Cryptography' (Neal Koblitz),
  Cryptography, Public Key Cryptography, Complexity of Computations, Algebra 기본, Hidden Monomial Cryptosystem, Combinatorial-Algebraic Cryptosystems, Elliptic curve, Pairings 등

◎ 영상처리

- Basic theory of Fourier Series and Analysis
- Basic theory of Multiresolution Analysis and Wavelet systems
- Interpolation and Approximation by Polynomials, Splines